

ABSTRACT

Into the Beehive—The Somali Habr Gidr Clan as an Adaptive Enemy by

Mark F. Duffield, Major, USAF, 56 pages.

On October 3rd 1993, US efforts in Somalia culminated as the result of an overnight battle that cost eighteen American lives and effectively silenced all optimism that Somalia could be externally resurrected as a functioning state. What began as a humanitarian mission to abate starvation had evolved into the absurdity of outright combat against the very people meant to be saved. Beyond the issues of political policy, lurks a disturbing fact that remains unaddressed by the US military. Out of the anarchy that was Somalia in 1993—and is like many other places where US forces may be, committed—an untrained, ill-equipped, and undisciplined enemy quickly adapted their tactics, invalidated key US planning assumptions, and evolved into a lethal force. The Habr Gidr's tactical adaptation outpaced the planning efforts of elite US units and achieved their tactical, operational and strategic goals at US expense.

This monograph explores how this adaptation occurred. It goes beyond the common theories concerning equipment, tactics, and the inherent difficulties of combined operations to look at the very nature of adaptation itself. It provides a different view of events in Somalia in hopes of better informing military planners facing a similar opponent. At its heart, this monograph explores the possibility that what appeared to be little more than an anarchic mob may have been a functioning complex adaptive system.

Beginning with a theoretical overview of adaptation by both rational analysis and complex adaptive systems theory, a test is developed to determine the presence of a complex adaptive system in a human population. The Habr Gidr are then subjected to the test to determine at what level they operated as such a system and if any adaptation can be attributed to its effect. The research compares the theoretical characteristics of the complex adaptive system to the situation existent in Mogadishu in 1993, then focuses on Habr Gidr adaptation to face challenges posed by superior US firepower and mobility. Finally, the monograph compares key US planning assumptions to Habr Gidr adaptation to see if a life span for the validity of assumptions can be calculated.

This study concludes that events in Somalia in 1993 can be viewed as the result of a contest between competing adaptation models. The US model, reliant on rational analysis, underestimated the Habr Gidr who adapted through a combination of both deliberate rational analysis and complex adaptive system theory. The adaptation of the Habr Gidr system was dependent less on time than on level of challenge. By October 3rd 1993, the more diverse method of adaptation employed by the Habr Gidr accentuated their one advantage (superior numbers) and adapted into the more potent force.

This monograph serves as a warning to future military planners that effective, asymmetric enemy adaptation models can arise out of a chaotic environment and lead to military defeat. It is also a warning against the trap of hyper-rationality where stagnant,

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even fragile, assumptions once proven are never again revalidated. Awareness of a possibility is the first step in eliminating vulnerability.

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Introduction

In Ernest Hemmingway's *Death in the Afternoon*, the author describes the goring of a famous matador Gitanillo de Triana. Late in the performance, near the moment of truth, the bull—no longer fooled by the flourishing *veronicas* of the cape—veered unexpectedly into the man. The horn punched deep into Gitanillo's left thigh. The bull lifted and spun the matador, hurled him against a wooden barrier, then spiked him through the right thigh. In a final attack the bull rammed a horn through Gitanillo's back and pelvis. Gitanillo suffered in the heat of the Madrid summer for nearly three months until he died.¹

Much like the contest between America and her likely opponents the *corrida* is not designed to be a duel between equals. The bull is strong, but primitive and untrained. The matador is superior in intelligence and has been trained from childhood, and while the bull is free to choose his method of attack, the man is restrained to a set pattern. The final outcome of the contest is nearly preordained, but the cost to the matador is not. Despite his advantage, the matador is not preordained to escape injury or even survive. The basic premise of the bullfight is that the *corrida* is the bull's first encounter with a dismounted man. He starts the fight with no knowledge of his enemy and only his instincts to guide him. The bull has only fifteen minutes to adapt.

It is telling that despite the bull's growing exhaustion and misery, most gorings occur in the final minutes of the contest. The bull has grown wary. He has begun to suspect that his real target lies behind the cape. In the final minutes of the contest, the tables begin to turn as the bull adapts to the tactics of the man. He becomes less predictable, more skillful and far more dangerous. In response to the high mortality rate

of matadors, in 1567 Pope Pius the Fifth declared—on threat of excommunication—that no bullfight be extended beyond the allotted time nor any bull be used more than once. The saying goes that “what takes a man a lifetime to learn, takes the bull but once in the arena.”²

Unlike the matador, no Papal edict protects the US military from the adaptability of the enemy. The bull is not killed in fifteen minutes. Hence an understanding of adaptation in all of its forms is required to enable effective military planning. Even those methods of adaptation that differ dramatically from accepted conventions and shake core beliefs deserve careful study. Unlike the matador—who controls adaptation by always facing a new and ignorant foe—the US military has no such luxury. The adaptation of a human enemy can not be so easily controlled. Somewhere between America’s next battle, and the one after next, the similarity between military conflict and the Spanish bullfight ends, and the US may be surprised at just how adaptable her enemies are.

This monograph explores one such case of asymmetric enemy adaptation—US involvement in Somalia during 1993—and seeks to answer the question of how this adaptation took place. It provides a different view of events in Somalia in hopes of better informing military planners facing a similar opponent. Is it possible that what appeared to be little more than a disorganized mob may have been a functioning complex adaptive system? This monograph develops a test for the existence of a complex adaptive system and then examines the Somali Habr Gidr clan to conclude the extent—if any—that it functioned as such a system. The research compares the theoretical characteristics of a complex adaptive system to the situation existent in Mogadishu in 1993, then focuses on

Somali behavior relative to US involvement. Of particular interest is the question of adaptation of tactics to face challenges posed by superior US firepower and mobility. Finally, the monograph compares the US planning effort to Somali adaptation to see if a life span for the validity of assumptions can be calculated. Such a “validity life span”—if possible to calculate—could be used to suggest a rule-of-thumb for reevaluating assumptions.

Chapter 1: Historical Background

On October 3rd 1993, US efforts in Somalia culminated as the result of an overnight battle that cost eighteen American lives and effectively silenced all optimism that Somalia could be resurrected as a functioning state. What began as a mission to abate starvation and misery had evolved into—as the author of *Black Hawk Down*, Mark Bowden puts it—“third world ingratitude and intractability.”³ The backlash caused feelings of “the futility of trying to resolve local animosity with international [US] muscle.”⁴ Political opponents and the media questioned and criticized the ever-changing goals of the international effort in Somalia.⁵

Somalia, which resides at the tip of the horn of Africa near the mouth of the Red Sea, is an arid expanse that by 1993 had sunk to a level of misery that redefined the term “failed state.” Armed to the teeth as a result of a past Superpower interest during the Cold War, Somalia’s numerous clans were equipped to inflict great harm on one another when civil war broke out in 1988. By 1992 Somalia was gripped by a famine of truly awesome proportions caused in part by drought, but primarily by the anarchy of inter-clan warfare where more than 14 clans were fighting to retain or expand their territory.

The apocalyptic images broadcast around the world brought cries for the US to step up to its responsibility as a world leader and intervene to end the suffering by imposing peace and protecting the delivery of humanitarian aid. Those cries were reluctantly answered in mid 1992 with the introduction of a US led force under UN auspices.⁶

By early 1993, the original mission to end the famine that gripped Somalia was largely successful. The interim cease-fire between rival factions permitted the successful distribution of food thus ending the wholesale starvation that had already killed 350,000 Somalis and threatened 1 million more.⁷ But the underlying cause of the famine, namely the simmering power struggle between rival Somali clans, remained unresolved. In 1993, the two most powerful Somali clans were led by bitter rivals General Mohammed Farah Aidid and self-proclaimed interim president Ali Mahdi. The unresolved political situation made humanitarian progress in Somalia tentative at best. In the attempt to consolidate the improved living conditions of the Somalis and prevent a recurrence of starvation, the UN shifted efforts toward nation building.

Although all Somalis speak one language and are of one homogeneous race, Somali society is subdivided by several major and numerous minor “clans”. Like many agrarian societies, the Somali clans are based on historical family ties and are linked to specific areas of land. The first step in the attempt to resurrect Somalia as a nation was to end the inter-clan warfare where starvation was not only a by-product of war but also a primary weapon. Nation building inserted the international effort directly into the hornets’ nest of internal Somali politics where widely divergent and purely self-serving clan interests and individual lusts for power polarized foreign personnel into the camps of either ally or enemy. The powerful Habr Gidr clan of Mogadishu, having led the

successful effort to expel the former regime, felt particularly slighted by US/UN policies designed to promote power sharing.⁸ Hence, the Habr Gidr began a military campaign to thwart the US/UN policy that disputed their clan's preeminent position of power in Somalia. When the Habr Gidr killed 24 Pakistani troops in what was concluded to be a deliberately planned ambush, the careful wording of UN resolution 837 that authorized "all necessary measures against all those responsible" left little doubt that the effort in Somalia had just taken on another mission—revenge.⁹ The instruments of revenge were US Rangers and Delta Force teams. Their means were raids designed to apprehend the Habr Gidr clan leadership—especially the clan leader Aidid—to reduce the Habr Gidr as a functioning entity and to capture those thought responsible for planning the Pakistani ambush.¹⁰

In what looked like a clear indication of superior US capability, the first six raids were tactically successful. The Habr Gidr clan appeared neither quick enough nor strong enough to resist the US raids even into the heart of Mogadishu. However the seventh broke the pattern of the first six. Within minutes of the insertion by helicopter, a sizable, well-armed Somali crowd had pinned down the US force and shot down two helicopters. The planned one-hour raid developed into a desperate overnight battle. In the final toll, eighteen US soldiers died, one was taken prisoner, a total of four helicopters were destroyed, and the international news carried pictures of a dead US soldier being further assaulted and dragged through the dirt streets of Mogadishu. This carnage plus a minimum estimate of 500 Somali dead led to the suspension of all future raids and focused US efforts on yet another new mission—exit. Within six months the US presence ended. In the brief period of US interest in Somalia, policy had come full-

circle, from apathy, to responsibility, to shock, to the desire for revenge and finally back to grim apathy.¹¹

Beyond the issues of political policy, and the unavailability of specific weapons, lurks a disturbing fact. Out of the anarchy that was Somalia in the summer of 1993 (and is like many other places where US forces may be committed) an untrained, ill-equipped, and anarchic swarm had—in less than three months—adapted their tactics and invalidated key US assumptions on their capabilities. The Habr Gidr got better, and it was good enough to bloody a carefully planned operation carried out by elite US units. In the Somali conscience, where comparative losses are not a concern, this battle is counted as a victory, and even in the US military where such comparisons are made, the battle is most often considered a watershed failure. This raises equally disturbing questions. How did this adaptation take place? Is the linear, rational planning model used by the US military vulnerable to checkmate by a swarm of individually-deadly but otherwise incoherent masses? Was there something going on in Mogadishu that was not perceived and therefore not considered?

Chapter 2: Theory and test development

The tactical adaptation of the Habr Gidr caught Task Force Ranger by surprise. The chaotic situation in Mogadishu in 1993 seemed poorly suited to an organized training effort, yet the Habr Gidr clan's military capabilities improved anyway. They solved a host of problems related to their inability to resist US military interventions. But is problem-solving the same thing as adaptation? In *Military Misfortunes*, Cohen and Gooch defined adaptation, in a military sense, as “identifying and taking full advantage

of the opportunities offered by enemy actions or by chance combinations of circumstances to win success or to stave off failure.”¹² Military adaptation can occur in the long term, such as development of new skills and adoption of new doctrine, or in the short term to face an immediate threat. In either case, the result of successful adaptation is “self-organization in the face of the unforeseen or the unexpected.”¹³ Successful adaptation is more likely when the goals are clear. In the US military culture, decision-making relies heavily on the use of analytical processes.¹⁴ The strong hierarchical organization tends to enforce this deliberate approach. But the deliberate approach to adaptation is not the only approach and a competition between a deliberate and a non-deliberate model, as outlined below, may have occurred in Mogadishu in 1993.

In *Sources of Power* Gary Klein investigated the host of methods used by individuals and organizations to sort their way through complex problems. Before delving into more controversial and the less well-known adaptation models, he outlined the more universally understood method—rational analysis—as a basis for comparison. Rational analysis is an organized, deliberate problem-solving model of the type favored by hierarchical organizations. The rational analysis model has four distinct steps. In the first step—decomposition—the task is analyzed. To accomplish this, the task is broken down into its most basic elements to enable calculations to be made on each component part. The second step is decontextualization where to help in the construction of a general theory, the problem is isolated from its particular environment. The intent is to avoid ambiguity as the search is made for the fair picture or model on which to build the generalized theory. Next comes calculation where deductive and statistical measurements are made. Together these first three steps perform a similar function to the

mission analysis stage of the US Army's Military Decision Making Process (MDMP).

The last step in this orderly and systematic approach is description. Here, the results from the first three steps are scrutinized in detail. Conclusions arise and suggest future courses of action which are then implemented. The description phase is similar to the Course Of Action development, analysis and comparison stages of the MDMP. The process is iterative and results in incremental improvements in performance.¹⁵

The rational analysis model has many strengths. The use of explicit data and rational calculation is useful in forming a common group understanding. It also “reduces the chance that an important option will be overlooked. It supports the broad search for many options, rather than deep searches of only a few options. It comes closer to error-free decision-making than [other methods]. And it allows the decision maker to use declarative knowledge.”¹⁶

The rational analysis model has limits and is not universally applicable. It is especially weak in non-scientific problem solving. First, decomposition has no clear rules and is unlikely to be accomplished in a similar manner by any two individuals. There is no “right way” to break down a task, and no commonly understood basic elements. Second, a complete separation of the problem from its context is unlikely and may not even be desirable in complex situations. In natural settings—those involving people and cultures—context usually proves vital in building a viable theory. Elimination of context in natural settings is a setup for unwittingly substituting ones own context for the real thing. This is often referred to as “mirroring”. Third, accurate calculations of other than strictly scientific phenomena are unlikely. When calculations require a judgement call or an estimation of probabilities—and natural settings always

do—usable accuracy is suspect at best. Finally, when dealing with the large number of factors present in natural settings, description and theory creation are subject to error brought on by the complex interaction of variables.

While rational analysis works well in scientific problem solving where the environment is more controlled and variables are systematically reduced and isolated, it runs into problems outside the laboratory. Where variables are numerous and interactions are not fully understood, the rational analysis method runs the risk of compounding errors carrying over in each step. Hence, the final product of rational analysis in natural settings runs the risk of meticulous calculation to a completely wrong answer. Taken to extreme, the use of rational analysis becomes a trap called hyper-rationality where an individual or group attempts to use only logical and analytical reasoning and risks losing the “big picture” as the focus remains on measurable details. The characteristics of hyper-rationality include the dismissal of aberrant data as unrepresentative and the development of unwillingness to act (or change action) without a logical, empirically measurable basis. Rational analysis can fail to identify change when the significance of aberrant data is either dismissed or averaged into the known trend.

Specifically tailoring his theories to a military planning environment, Klein noted the dependence of the MDMP on rational analysis. He noted an attitude of over-use of rational analysis “built into military doctrine”.¹⁷ With all of the problems identified above, why does military planning favor rational analysis? One possible explanation is that the similarity ends shortly below the surface. If military planning is a mixture of art and science, the “science” is the careful application of rational analysis while the “art” is

the planner's and commander's input to consider the confusing effects of the natural setting where rational analysis is weak.

While man may employ rational analysis as a deliberate means of stimulating adaptation, natural adaptation can not. In Kevin Kelly's book *Out of Control* one of nature's answers to adaptation is presented along with nature's method of actually thinking. The mystery manifest in such phenomena as flocks of birds that maneuver as one, intelligent decisions made by ants, and even the seemingly inexplicable patterns of world economies are explored. The concept of the "complex adaptive system" emerges in the gray area between the "order" we understand and the "chaos" that confounds us. Kelly develops a convincing case that such a system will emerge wherever the proper conditions exist. These conditions include a relative lack of centralized control where numerous, autonomous sub-units have a high level of connectivity. The raw mass self-organizes into a non-linear web of cause-and-effect where the individual is de-emphasized for the benefit and survival of the whole, and the system operates and adapts with no overall leader or architect.¹⁸

The benefits of the complex adaptive system are many. It is adaptable in the short term and evolves to face changing conditions in the long term. It is resilient to shock due to the independence of the sub-units and the non-linearity of the system's control. Finally, the system excels at developing novel approaches to problem solving by benefit of the exponential trial-and-error combination of interacting sub units.¹⁹

Kelly also lists the disadvantages of complex adaptive systems, although in the context of competing with such a system, some of these "disadvantages" look more like strengths. First, complex adaptive systems are "non-optimal" in that they employ a high

level of duplication of effort through continual trial and error. Second, they are “non-controllable” and third, they are “unpredictable.” With no central authority, and no hierarchical control system, actions taken by the swarm are rarely forecast and are not easily influenced in mid-course. Finally, complex adaptive systems are “non-immediate” in that system reaction time is usually longer than linear systems. In dealing with the multitude of sub-units—that all contribute en masse to the decision-making process—a longer “biological” time is required to respond.²⁰

M. Mitchell Waldrop’s book *Complexity* adds to the understanding of the complex adaptive system. Waldrop develops the concept of the complex adaptive system as a perpetually reorganizing entity with many levels of organization that continuously work in parallel. Such systems anticipate the future with built in subroutines of behavior that rearrange, test, and refine new approaches to problems.²¹

It is not enough to describe and model the complex adaptive system. A more-thorough understanding of such systems requires that we ask an additional question. What or where is the entity that directs the swarm? Kelly assures us that no one exercises such control—none of the sub-units and certainly no external being. Kelly’s answer to the question of control is the “hive mind.” The hive mind is a slippery entity perhaps as easily described by listing what it is not. In the hive mind, “no one is in control yet an invisible hand governs.” Instead of a hierarchical organization, distributed function—decentralized decision-making by the masses—is used. Linearity is shunned in favor of dispersed parallel thinking. The mind of a complex adaptive system is not a “series of critical individual actions but a multitude of simultaneous actions whose collective pattern is far more important.” Hence, the hive mind is this collective pattern and its

strength and wisdom are measured in its relative immunity to disruption and its efficiency in solving problems. In more concrete terms, a hive mind exists wherever organized and coordinated action is taken by a large group of individual sub-units in the absence of a centralized, hierarchical, or rank structured control system.²² With an understanding of the hierarchical decision-making of rational analysis and the distributed method of the complex adaptive system, the theory will now be used to develop a test for application against the Habr Gidr clan of Somalia.

In order to judge whether or not the Habr Gidr adapted along the lines of complex adaptive system theory, a test is needed. No such test currently exists, therefore one will be developed here. The theoretical work and research available described such systems and predicted their behavior, but made no attempt to tell anyone how to find them. The research took for granted that it had found such a system and then delved into its description. In dealing with bees or ants, this assumption is fairly safe. But in the leap to humans, it can not be taken for granted that behavior is explainable by complex adaptive system theory. But neither should it be casually ruled out. While bees and ants form systems that seem primitive compared to those formed by humans, the theory is clear that humans also form such systems for certain functions that operate in parallel with the linear, rational and hierarchical systems that are better understood. Although Kelly used the beehive as his prime example, he provided abundant evidence of human use of such systems. Market economies, unified crowd responses, riots, and even fashion trends are such examples. However, each situation must be tested to see if the behavior is explainable by the stated theory or by some other means such as rational decision making or hierarchical rank ordered leadership.²³

Although no test for validating the presence of a complex adaptive system currently exists, Kelly and Waldrop provided plenty of clues on how to design such a test. The unique characteristics of adaptive systems can be used to develop a test to categorize an observed system as either a complex adaptive system or a hierarchical system. The test will have a total of three criteria—two criteria for proving the existence of a complex adaptive system and one for proving that observed adaptation can be explained by the theory. The two criteria for proving the existence of a complex adaptive system are existence of a conducive environment and a display of the theoretical characteristics. The theory of Kelly and Waldrop stated that if the environment is right, a complex adaptive system will emerge. Furthermore, if the system in question looks and acts like a complex adaptive system, then it probably is one. The criterion for proving that observed adaptation follows complex adaptive systems theory is that such adaptation occurred as the theory predicts. If system adaptation to stress follows the theory for complex adaptive systems, then the evidence for proving the dominant effect of such a system builds. Finally, the absence of any other explanation for the observed adaptation makes the test conclusive. Summed up, the test—which will be developed in detail below and applied in a later chapter—looks at an existing system to see if it matches the theoretical model for a conducive environment, a display of system characteristics, adaptation as the theory predicts, and lack of any other dominant effect.

The first criterion in the test for a complex adaptive system is a look at the environment. The theory tells us that if the environment is conducive to the emergence of a complex adaptive system, such a system will emerge. An important environmental factor is the absence of strong centralized control. It seems that complex adaptive

systems need a certain level of freedom to form and function. The confusion of a beehive is the most common example. The worker bees come and go as they see fit. There is no hierarchy of leadership issuing orders of what to do or when to do it. Despite her misnomer, the “queen bee” exerts no control over anything. In a human system this lack of a strong centralized control might look like anarchy on a large scale where the people are free to do as they see fit in the pursuit of satisfying their needs. An absence of authority or strong governmental control would provide such freedom. In a more practical sense, absence of centralized control in a human system could mean lack of governmental control, absence of linear, hierarchical leadership/followership (elected or imposed), and lack of strong social institutions to assume the role of strong leadership in the absence of governmental control. So as not to overstate the need for freedom, a lack of centralized control need not be system wide. Complex adaptive systems can form in narrow niches where a lack of control exists. Black Market economies in otherwise despotic, hierarchical states are just such an example.²⁴

Within an environment lacking strong centralized control, the sub-units themselves—whether human or insect—require certain characteristics to enable the emergence of a complex adaptive system. First, there must be a numerous population. Complex adaptive systems do not form among small or sparse populations. Second, the sub-units must display autonomous behavior. If the sub-units are incapable of acting independently, a complex adaptive system will not form. A numerous population with a high level of autonomy is vital to producing the numerous interactions and trial and error that lead to the success of a complex adaptive system. Another crucial part of the environment is a high level of connectivity between sub-units. Connectivity is required

for the system to transfer information between sub-units and to maintain inertia toward a designated end.

In characterizing the sub-units, the population of the beehive is the perfect example from nature. A typical beehive contains hundred or even thousands of sub-units that all live in the same place. While they have the freedom to act as they see fit, they always come back to the same nest where they communicate by a primitive but effective method. They are numerous and autonomous, yet highly connected. Within a human system all three of these factors, numbers, autonomy and high connectivity would be met easily by any large group that spoke the same language. A densely populated city comes quickly to mind. If the first environmental factor—lack of centralized control—is added, a familiar picture from the evening news begins to emerge. A densely populated city in a failed state meets all of the environmental factors covered above and is fertile ground for the emergence of a human complex adaptive system.²⁵

To sum up the test's first criterion—conducive environment—and to narrow its scope for application to a human system, four questions fall out. Is there a lack of overbearing centralized control? Is there a numerous population? Do the individuals exhibit autonomous action? Finally, is there a high level of connectivity between the people? If the answer to all four questions is yes, then the environment is conducive to the emergence of a complex adaptive system.

The second criterion of the test for the existence of a complex adaptive system concerns the characteristics of the system itself. Quite simply, if the system in question looks like, and acts like a complex adaptive system then it probably is one. In the formation of a test, the characteristics unique to a complex adaptive system—those that

distinguish it from a hierarchical system—will be identified and isolated. Again, the theoretical work of Kelly and Waldrop have provided the necessary tools.

The first unique characteristic of the complex adaptive system is its ability to self organize. In hierarchical systems, the organization is from the top down. The leader imposes a certain order on the masses and assigns tasks toward a designated end. In a complex adaptive system, there is no overall leader and no rank structure, yet organization spontaneously emerges. Revisiting the beehive example, no rank structure exists and no one bee is in charge, yet pollen is collected, young bees are tended, the hive is repaired, and threats are confronted en masse. This is what is meant by self-organizing behavior. In a human complex adaptive system self-organizing behavior would closely resemble the tasks carried out by the beehive. In the absence of centralized control, the human system would not collapse or dissolve. It would still maintain itself. In practical terms, this would mean that despite a lack of governmental control or other rank structured hierarchy, essential tasks for survival would still be accomplished such as provision of food, water, shelter and security.²⁶

A second characteristic unique to a complex adaptive system is its high level of duplication of effort. In hierarchical systems, the linear organization minimizes this effect by imposing order on how tasks are accomplished. With no rank structured organization, a complex adaptive system has no method of preventing duplication of effort. Each of the autonomous sub-units has the freedom to choose its own tasks to accomplish and its own methods. A high level of duplication of effort is the by-product. Applying this to a human system, this characteristic would be easily identifiable. In a hierarchical, rank structured organization, there would be little duplication of effort. The

people would specialize on certain tasks and devote most of their efforts to that task alone, and strategies that fail would be more quickly discarded. In a complex adaptive system, the symptoms of high duplication of effort are lower levels of specialization and repeated use of the same method of accomplishing a task. In more concrete terms, lots of people will be doing the exact same tasks—with the same success or failure—instead of just a few specialists.²⁷

A third unique characteristic of the complex adaptive system, and certainly one of its greatest strengths is its resilience to shock. In a hierarchical system, the linear rank structure provides a vulnerability. A disruption of the rank structure disables—at least temporarily—the part below. Disruption at the top of the rank structure can cause the system to collapse. A complex adaptive system has no such vulnerability. With no rank structure to attack, the system is not easily disturbed, and the criticality of any one individual or group is de-emphasized. The system maintains its capabilities and continues functioning in the face of challenges that topple rank structured organizations because of the nature of its decentralized operation. There is no head to decapitate and little short of a complete extermination of the sub-units causes systemic collapse or loss of function. In a human complex adaptive system, resilience to shock would be exhibited by the ability to suffer major setbacks such as political upheaval and high casualty attacks without a systemic collapse. Disruptions to nominal leadership chains would have little or no effect on the system as a whole and would be quickly accommodated. A complex adaptive system quickly bounces back from the same type of attacks that cause systemic collapse in hierarchical systems.²⁸

The final characteristic in the second criterion of the test is the existence of a hive mind. In a hierarchical system, decision making occurs at the top of the rank structure and tasks that form a pattern are assigned down to the lower levels. The overall leader maintains the “big picture” of what is being accomplished and adjusts the coarse of events as required. As shown, in a complex adaptive system, no one is in charge yet overall patterns emerge from the dispersed parallel thinking of the sub-units. No single individual sees a big picture, but the overall system displays an understanding that no single individual possesses.²⁹ This is the key to identifying a hive mind as part of the test for a complex adaptive system. If patterns emerge, and collective action is taken directed effectively toward a common task, yet no single individual understands the overall plan or is directing the effort, then a hive mind is at work. The presence of a hive mind would be most easily isolated in the accomplishment of short-term tasks where the absence of centralized control or planning would be more easily identified.

To summarize the second criterion in the test for a human complex adaptive system, the unique characteristics of such a system are self-organization, high duplication of effort, resilience to shock, and the existence of a hive mind. If all four appear, then the criterion is met.

If the two criteria described thus far are satisfied, then it can be concluded that a complex adaptive system exists. But simple identification is not the point of this monograph. As a work designed to expand the knowledge of a military audience, the relevance of this work rests on identifying adaptation resultant in a complex adaptive system as opposed to adaptation by other means. This work must also illuminate the threat that such adaptation can pose in a military operation that perhaps ignores such a

possibility. If the US planners anticipate enemy adaptation by rational analysis and linearly controlled decision-making are they blind to the possibility of adaptation by other means? If there is little understanding of adaptation by any other means then will such “asymmetric” adaptation remain unrecognized? As previously discussed, Klein determined that military planning exhibits an over-dependence on rational analysis and ignores some of the more spontaneous methods of decision making. As one of the least understood adaptation models, complex adaptive system theory is not considered in any military planning model. It is certainly not considered in any planning model. If a military audience comes away from this monograph understanding that challenging tactical adaptation can occur in a system unlike their own, then this work will have accomplished its task. Adaptation—the middle name of the complex adaptive system—will be considered separately. One criterion must be met to prove that adaptation occurred according to the theory, namely that such adaptation occurred as the theory predicts, and that no other explanation for adaptation—such as rational analysis—is forthcoming.

Adaptation exhibited by a complex adaptive system displays a high level of novelty and effectiveness despite a lack of centralized planning or control. Kelly makes a convincing argument that the novelty of new approaches displayed by a complex adaptive system is superior to that of hierarchical, rank structured adaptive models. Such systems adopt new approaches that no one predicts or even imagines ahead of time. Equally amazing is the effectiveness of the best of these novel approaches. The key to this strength is the vast number of trial-and-error attempts thrown at an individual problem. Although the trial-and-error process of a complex adaptive system produces

many approaches that fail, its strength lies in the novelty and the brilliant effectiveness of the best of those that do succeed. In general, the best approaches produced by a complex adaptive system are superior to the best approaches produced by a rational analysis system. The adaptation of a complex adaptive system is non-linear over both time and system stress. The numerous trial-and-error attempts generally result in relatively sudden improvement in capability.³⁰ Observed adaptation can not be attributed to complex adaptive system theory unless the presence of a hive mind can be observed and other means of adaptation are ruled out. Other adaptive methods, such as rational analysis, require strong centralized control. Therefore, proving a lack of such centralized control satisfies the criterion of ruling out other adaptive methods. As a final piece of the puzzle, proving the presence of a hive mind—in effect proving that organized and coordinated effort occurred in the absence of hierarchical control—completes the fulfillment of the criteria for proving that observed adaptation is the result of a complex adaptive system.

The development of a test for the presence of a complex adaptive system is now complete. Using the theoretical work of Kelly, Waldrop and Klein, and thinking strictly in terms of testing a human system, three criteria have been isolated that prove the existence and adaptation of a complex adaptive system. The three criteria are; existence of a conducive environment, a display of the unique theoretical characteristics, and adaptation as the theory predicts. One factor that must be kept in mind is that proving the existence of a complex adaptive system does not require proving the absence of a hierarchical system. Hierarchical and complex adaptive systems often function in parallel. A widely decentralized market economy in a hierarchically organized democracy is such an example of functioning parallel systems.³¹

Chapter 3: Test application – Environment and Characteristics

Proving the existence of a conducive environment in the test for a complex adaptive system is a straightforward process concerning Somalia due to the abundance of evidence. The components of a conducive environment include the absence of strong centralized control where a large population of sub-units displays autonomous behavior and a high level of connectivity. As concluded in the test design, any large city in a failed state meets these conditions quite convincingly.

As Terrence Lyons and Ahmed Samatar generalize in the opening pages of their pamphlet on Somalia, the nation-state—long the fundamental unit of international politics—is under attack across a wide front. The state—that political entity with borders—is challenged by the forces of international economics and political liberalization, and by the cessation of the polarizing and stabilizing influences of the Cold War. Even more ominous, the nation—that group that self-identifies as a people—faces the emergence of real or created cultural cleavages.³²

It is revealing that in all books, videos, pamphlets and conversations about Mogadishu, one consistently encounters the word “anarchy.” The Mogadishu of 1993 was a city that had sunk to the lowest, meanest level on the scale of modern urban existence. In their chronicle of UN peace-keeping operations in the 1990s, the usually reserved, even apologetic language of William Durch titles his chapter on Somalia “Introduction to Anarchy.” By 1992, Somalia—always a fragile, artificial creation—had come completely apart. Few of the trappings of centralized anything remained. There

were no police, no courts, no public administration, and no services such as electricity and water. Dorch's title truly fit.³³

This lack of centralized control went beyond lack of government. On a cultural scale, "Pan-Somalism", a weak byproduct of the pastoral, agrarian past, had been completely destroyed. Somalia's brief flirtation with democracy in the post colonial period was marked by political campaigns that exploited clan rivalries and divisive history as the only electoral issues. The successful coup and twenty-year dictatorship of Siad Barre further aggravated the enmity and polarization of Somalia's clans. Barre, despite his outward campaign against tribalism, manipulated clan antagonisms in a classic "divide and rule" strategy designed to keep the majority opposition from coalescing by keeping them at each other's throats. Meanwhile he quietly maintained his own clan (Darod) in power. Naturally, the power struggle that followed the Somali civil war that removed Siad Barre was fought along clan lines and finished off what little Pan-Somali spirit may have remained. By 1993 Somalia had ceased to exist as a nation or as a state. The ethnic Somali people and the land mass still called Somalia disintegrated into fragmented groups of people and geographic areas along well-defined clan lines.³⁴ With the apparatus of the Somali nation-state removed from power, the clan could not fill the void vacated by governmental control to exert a moderating influence on individual behavior. The clan—while fundamental as an affiliation—is not very effective at exercising strong centralized control. While certainly hierarchical, and able to exert influence on the group as a whole, the clan is not a strong authoritative organization. As a matter of degree, compared to the strong internal control mechanisms present under the dictatorship of Siad Barre, the individual clans were weak as a means of centralized

control. In comparison to a hierarchical administrative system (a kind phrase for Siad Barre's police state), the Somali clans lacked the tools to enforce individual behavior in that they lack effective police, courts, or administration. Clan organization is far less formal. With the fall of Siad Barre's regime, centralized control was dramatically reduced.³⁵

Although the clan lacks the tools to enact strong centralized control, it is extremely effective at keeping its members informed and aligning goals. Despite high illiteracy, Somalis are highly connected by a rich oral history and a keen interest in gossip. "Somali people love to talk, and current business often takes a lower priority as Somalis recount lineage structures and family [clan] issues."³⁶ They also like to listen.³⁷ Radio shows have long been a routine method for clan leaders to spread news and propaganda to influence public opinion. Aidid himself used his clan controlled Radio Mogadishu and even CNN for this purpose.³⁸ The connectivity associated with clan membership transcends all other facets of an individual's association. With the vast majority of Somalis, the clan forms the economic, political and social life. The blood ties "heer" of the clan are the only institution and the only identity. Hence, members adopt the political goals of the clan, usually without question, as their own personal goals.³⁹ With the self-destruction of the Somali nation-state, the people—while homogeneous in ethnicity, language, and religion became deeply divided (and grouped) by clan, sub-clan, and family. "Clan conscience has been described as centering around the struggle for recognition in all its forms—social, political, economic, and cultural rights and status."⁴⁰ Operating within an environment with no nation-state after 1991, the various clans,

already the prime source of identity, became the only remaining institution to which any Somali could claim membership.

The 1993 situation in Mogadishu and with the Habr Gidr clan clearly fulfills the first criterion of providing a conducive environment for the emergence of a complex adaptive system. In comparison to the authoritarian control of former Somali dictator Siad Barre, or any western state where police, courts, or public administration were functioning, the Somalia of 1993 exhibited little sign of strong centralized control. The only remaining organization—ethnic clans—while strong as an affiliation and means of information transfer, was not an overbearing authoritative control mechanism. Thus the Habr Gidr enjoyed the level of freedom that a complex adaptive system requires to flourish. Within their relatively uncontrolled society in Mogadishu, the Habr Gidr met the remaining environmental factors (large population, connectivity and autonomy) that enable the development of a complex adaptive system. The population (sub-units) of the Habr Gidr was numerous and densely packed in and around Mogadishu. As a society, the Habr Gidr were well connected to each other and to local events by Radio Mogadishu and by simple word of mouth. Finally, they displayed a willingness to act independently as individuals. As a population, the Habr Gidr fulfill the theoretical enablers for the emergence of a complex adaptive system.

Having shown Mogadishu to be an environment conducive to the emergence of a complex adaptive system, the second criterion will compare the unique theoretical characteristics of such a system to those exhibited by Somalis in general and the Habr Gidr in particular to look for a match. From the test design, if the Habr Gidr were operating as a complex adaptive system versus as a hierarchical system, they would

display certain characteristics including an ability to self-organize, a high level of duplication of effort, a resilience to shock, and the footprint of a hive mind.

Historically life has always been difficult in Somalia. Provision of even basic survival needs—challenging in the best of times—became severely aggravated by the civil war of 1991 and the inter-clan power struggle that followed Siad Barre’s downfall. With Somalia having descended into the depths of a failed state and with civil war and looting having destroyed what remained of the public services, self-organization would be focused on providing the basic survival needs of the individual. However, the most compelling evidence of self-organization comes from before the war in the form of the history of Somalia itself. Lack of centralized control was not new to Somalia in 1991. The people have, more often than not, been responsible for providing their basic needs. Somalis have historically self-organized, by family, village, and clan to face natural and man-made challenges. In more recent history—with the exception of the aftermath of the Somali civil war, where starvation was used deliberately as a weapon against rival clans—spontaneous self-organization, usually along family lines, continued to successfully fulfill those same needs. Self-organization did not stop with the family, village, or even clan unit. The internal Somali economy—although certainly no model—did not fall with the Somali State. It converted (self-organized) to 100% black-market. When the police and courts disappeared, informal organizations based on neighborhood and family ties, self-organized to guard possessions and to dispense security and justice.⁴¹

In the effort to resist external intervention, the Habr Gidr displayed a surprising level of spontaneous organization. A clear example—a preview of what was to come later—occurred on September 9th 1993. Having been systematically cut off from the

supply routes out of Mogadishu needed to sustain the international effort in northern Somalia, the UN tasked the 362nd Engineer Company along with a Pakistani armored platoon to remove roadblocks and reopen the critical road linking the port to the routes north. In brief, the plan was to use Pakistani armor and infantry to provide security while the US engineer company cleared the obstacles. During execution, what began as a few guards on the obstacles and a small crowd of onlookers, developed rapidly into an effective opposition. With less than half of the obstacles removed, the mission was abandoned as survival became the key concern.

All elements were engaged from the north and south. The tanks in the rear moved forward to suppress...the entire element was now stopped and unable to move in either direction. The fires to the front were too intense and the crowds were replacing the obstacles the unit had just cleared in the south. The objective now was to get to the Pakistani stadium.⁴²

The final result of the failed attempt to reopen the road—which required helicopter suppression to even extract the force—was 1 killed, 5 wounded, and a tank and bulldozer destroyed. An estimated 100 Somalis died and hundreds more were wounded. In his monograph detailing the battle, Captain (then Lieutenant) Kennard M. Murphy II blamed the failure of the mission on poor mission analysis and lack of unity of command. While perhaps contributory, the size and tenacity of the Somali response he describes make it highly doubtful that the mission was possible under even the most ideal circumstances of planning or command. Captain Murphy is guilty of a speculation common to many accounts on events in Somalia. “It is obvious that the [Habir Gidr] was ready...the quick escalation from sporadic potshots to planned fires covering road blocks, indicates they had a plan.” In reading the account, one can feel Murphy’s searching frustration when he claims that Aidid himself had reportedly even directed part of the battle. While

appreciating the author's exasperation with the mission's failure, and his sincere search for reasons, little about the Somali response points toward "a plan". The graduated response, the mixed makeup of the crowd and the fire from every direction by a variety of weapons indicates that the response was spontaneous, not planned. In all likelihood, those Somalis within range swarmed to the scene and self-organized into various components to contribute to the effort without anyone having told them how to do it.⁴³ The nature of the attack on Captain Murphy's unit is confirmed by Mark Bowden's interview of Bashir Haji Yusuf. A lawyer partly educated in the United States, Bashir stated that the crowd formed spontaneously without any prior planning.⁴⁴

The second unique characteristic of a complex adaptive system is a high level of duplication of effort. The symptoms of high duplication in a human system are low levels of specialization and repeated use of the same methods—successful or not. With its roots in a subsistence-based, nomadic, pastoral existence, even the urban Somalis have a background in self-sufficiency down to the family level. "Social formations were characterized by the intermeshing of economic production, political life, and culture. Production, which was small in scale and coterminous with consumption, was done within the *rer* (household)."⁴⁵ In the countryside, little specialization of labor was needed outside of the family or village unit. Even in the cities, where specialization of work was more widespread, the conditions existent in Somalia after 1991 eliminated most economic activity and by necessity even the most skilled of workers were reduced to accomplishing simple survival needs such as procuring food, shelter and security.

Certainly a weakness, high duplication of effort was also prevalent in the battles that the Habr Gidr fought with the UN forces. In the October 3rd 1993 battle, duplication

of effort resembled chaos. “Women and children were screaming and running at us from all directions. Some of them had weapons, and some did not. The weapons ranged from machine guns to small knives and machetes.”⁴⁶ In another example, duplication of effort looked like utter stupidity. “The Somalis became bold when the Little Birds had to leave to refuel and rearm. But we would cut them down the minute they came near our positions. The Somalis were not trained to fight at night and several times they walked towards our perimeter into the open. Time and time again they were cut down in a hail of bullets.”⁴⁷ High levels of duplication of effort, as exhibited by lack of specialization and repeated use of the same methods, is a characteristic of Somali society including the Habr Gidr.

In battles with UN forces, and especially in those with the US, the Habr Gidr routinely suffered disproportionate losses, yet remained undeterred in joining battle the next time. In the Somali civil war and in the famine that followed, hundreds of thousands of Somalis died. Yet the cornerstone of Somali organization—the only true affiliation Somalis feel—continued to function unabated and even grew in importance. The clan—that affiliation most basic to all Somalis—displayed a remarkable resilience to shock. As with the beehive example of a complex adaptive system, little but the complete extermination of the sub-units, an entire clan in this case, could prevent the system from continuing to function. To date, nothing that man or nature has thrown at a Somali clan has disrupted its continuity or centrality to Somali life. The decentralized functioning of the Habr Gidr clan’s resistance to the UN efforts was not vulnerable to the attacks placed on it. In the September 1993 attempt to reopen the supply routes to northern Somalia, Captain Murphy flatly admits that despite relative losses of at least 100 to 1, “the [Habr

Gidr] had dealt the UN a severe blow. The [Habr Gidr] achieved a tactical victory, be it at high costs, that had immediate operational impacts.”⁴⁸

Perhaps even more indicative of the resilience of the Habr Gidr clan is their performance in the face of the Task Force Ranger strikes at their leadership. As a result of the first six raids, Task Force Ranger did capture some of the key clan leadership and drove most others—including the clan leader Aidid—into hiding where they were less able to influence events. Yet the clan continued to function and even improved the methods of resistance. Although clan leadership was identified by position and name, and appeared to fit nicely onto a hierarchical chart, the nature of clan leadership is in reality more similar to the poorly named queen bee. Strikes at clan leadership did not have the expected disruptive effect on the clan system because, like the queen bee, the leadership did not exercise strong control. As will be addressed in more detail below, the hive mind was a more significant mechanism of control and did not rely on clan leadership. The autonomous operation (hive mind) of the clan combined with the parallel hierarchical organization with a virtually unlimited number of hereditary replacements gave the clan structure a strong resilience to attacks. This made US attacks on clan leadership ineffective at reducing or subduing the Habr Gidr clan.

The British fell into a similar but somewhat opposite ended trap with a different Somali clan in their early attempts to colonize northern Somalia. With their interest in the seaport of Aden as a link to colonial India, the British attempted to use indirect rule through Somali “chieftains” (clan leaders). It did not work. The British overestimated the power of the clan leader and underestimated the autonomous decision-making (hive mind) of the clan. Despite the genuine willingness of the chieftains to submit to British

control, the British soon found themselves at war with the local clans. The British had secured an agreement with leaders who did not have the level of centralized control that the British thought could be used to secure the acquiescence of the people.⁴⁹ Somali clans—the Habr Gidr included—display a heartiness and a resilience to shock that survived challenges that few hierarchical systems could have withstood. The individual and even the leadership are de-emphasized, and like the beehive, the Habr Gidr clan continued to operate despite decades of adversity, which included political sidelining under Siad Barre, high losses in numerous conflicts or disasters, and organized attacks on nominal leadership.

The final piece needed to classify the Habr Gidr as a complex adaptive system is the demonstrated presence of a hive mind. The hive mind is that collective pattern that forms spontaneously. The distributed and illusive nature of the hive mind makes it difficult to pin down directly. However, the symptoms of its existence are within reach. As summarized in the test development, if patterns emerge and collective action is taken directed effectively toward a common task, yet no single individual understands the overall plan or directs the effort, then a hive mind is at work.

Perhaps the best and clearest example of a pattern of collective action occurred during the battle on 3 October 1993. During the 18-hour battle, in separated parts of Mogadishu, the Habr Gidr executed numerous actions distributed over space and time. Individually these independent actions managed to mobilize the citizens, shoot down helicopters, pin down the soldiers on the ground, swarm two crash sites, erect obstacles, and delay rescue by engaging two vehicle convoys. All of these actions contributed to one goal—destruction of the Task Force Ranger. But did any one Somali direct the

overall effort? While it is impossible to prove a negative assumption, there is no evidence of any overall leader coordinating the widely separated battles. While a few militia members were seen directing small group efforts, individual initiative on the part of the militia members and not a hierarchical chain of command determined the objectives. No evidence, nor even a claim, of an overall commander can be found. Those Somalis interviewed after the battle help confirm the absence of an overall commander in two ways. First, none mention an overall plan or leader. Nor is Aidid mentioned as having had any participation in leading the battle. Secondly, all of the Somalis interviewed indicated individual decisions—for themselves and those around them—on actions taken during the battle. “When the helicopter went down he rejoiced and began running toward it”.⁵⁰ “Many people were running toward the fight. Abdi wanted to see for himself, so he joined the crowds moving that way.”⁵¹ A thorough search of reliable sources, including Aidid’s own interpretation of events in his radio broadcasts, reveals not one example, or even a claim, of an overall commander of the battle.⁵² A hive mind was at work.

The Habr Gidr meets the second criterion of the test. In an environment conducive to the emergence of a complex adaptive system, the Habr Gidr display all of the unique characteristics of such a system. Out of the anarchy of the absence of centralized control, the Somalis maintained an effective system that self-organized, maintained, and protected itself, and worked toward a common goal. With no hierarchical authoritative direction, those efforts displayed the predicted high level of duplication of effort but still managed to achieve success—as they define it. The individual was de-emphasized for the success of the whole. The effect of a hive mind is

seen in the emergence of effective, complex patterns that no one person had designed. In 1993 the Habr Gidr clearly were operating—at least on a significant parallel level—as a complex adaptive system with all of its inherent strengths and weaknesses. The forces deployed to Somalia in 1993 did not understand this. In account after account, participants to the UN effort express amazement at the effectiveness and novelty of methods used by the Somali crowds. In many of the accounts, the attempt is made to explain the Somali behavior as the execution of some grand plan controlled from somewhere. Others reveal a surrender of even the attempt to understand events by claiming that the Somalis were lucky or just weird. With the stage set for a direct competition between the hierarchical system and a complex adaptive system, the competition for superior adaptation can now be investigated.

Chapter 4: Test application – Adaptation

In John W. Dower's *War Without Mercy* the author details a clash between two civilizations that understood little, yet assumed much, about each other. In World War II the Americans started out contemptuous of their Japanese enemies, thinking of them as little more than inept and timid. The Japanese were equally blind in their assumption of westerners as degenerate and week willed. Both sets of assumptions proved false, but propelled America and Japan into a collision with consequences that neither understood.⁵³ Although certainly much smaller in scale, the US involvement in Somalia involved a similar misunderstanding of the capabilities, intents and the very nature of the opposing sides.

To meet the third criteria of the test for a complex adaptive system, the observed adaptation must occur as the theory predicts. This equates to a high level of novelty, a non-linear effectiveness, and a high level of trial and error. Adaptations in capability to engage helicopters and in improved response time will be investigated to see if they match these characteristics. As will be shown, Habr Gidr adaptation meets the third criteria, but not exclusively. The Habr Gidr adapted by two parallel means. The first is the deliberate employment of rational analysis to develop an effective anti-helicopter capability. The second is a non-deliberate adaptation that occurred as predicted by complex adaptive system theory that effectively improved response time. This combination of parallel adaptive methods was synergistic and proved decisive.

The US, as part of a UN force, entered Somalia anticipating a short-term mission and ended up in a relatively long conflict of a nature that no one anticipated. The mission was originally anticipated to last less than sixty days at which time Somalia would have

stabilized to the point that the non-governmental organizations would be able operate without military escort. As this paradigm proved false, US involvement grew in size and scope.⁵⁴ By the time Task Force Ranger deployed to Somalia, the US was in an open conflict with the Habr Gidr clan. To prosecute one of the eventual missions, marginalizing the Habr Gidr, the US planners made certain informed assumptions concerning the Habr Gidr that will be investigated in relation to the eventual adaptation of tactical skills.

As a seriously outnumbered force, the Rangers relied on a combination of surprise and speed. The key provider of both was the helicopter. The Blackhawk is a rugged machine designed to take a great amount of punishment and survive. The Somalis had no specifically designed anti aircraft weapons. The US forces anticipated that they could deal with the relatively-low threat posed by small arms fire and Rocket Propelled Grenades (RPGs) by employing tactics emphasizing low altitude, speed, and counterfire by door gunners and attack helicopters. All of this combined to produce an assumption of invulnerability of the Blackhawks.⁵⁵

Another necessary ingredient to Task Force Ranger's ability to conduct operations involved the estimation of Somali capability to respond, specifically the time required to mobilize forces to engage a ground force inserted into Mogadishu. Important and misleading factors in this calculation included the dispersed nature of the Aidid militia, the physical size of Mogadishu, and the lack of modern military communications among the Habr Gidr. Although it is unclear how the calculation was made, Task Force Ranger planners worked on the assumption that the Habr Gidr needed approximately one hour from the time of "boots on the ground" to mobilize sufficient combat power to threaten a

US mission. The “start clock” for Somali reaction time was insertion of combat forces, or ‘boots on the ground’ and not the helicopters’ sortie from base. The numerous (twice daily or more) over flights of Mogadishu dulled reaction to the helicopters, and the raid’s destination (the point to mobilize against) remained unknown until soldiers actually hit the ground. The one-hour assumption proved accurate from skirmishes that occurred before the Rangers arrived and on the first six missions that Task Force Ranger executed, including those into the heart of Habr Gidr territory in Mogadishu.⁵⁶ The assumption seemed to be proven by experience and there is no evidence that improvement was considered possible. In what proved to be a fatal flaw in US planning, the second assumption detailed here was inextricably linked to the first. The feasibility of US raids based on the one-hour reaction time was dependent on helicopter survival for insertion and/or extraction. A corollary assumption to the one-hour Habr Gidr reaction time was that the Rangers could complete their mission in less than one hour. The flaw in the logic was that if a helicopter did go down, the US raid was not going to be able to complete its mission within the one-hour window of relative safety.

Long response time and an inability to effectively engage helicopters were not the only assumptions made concerning the Somali capabilities. Although impossible to measure numerically, the US force, including the Rangers, displayed an air of superiority and invincibility, perhaps even arrogance, in comparing their capabilities to those of their enemy. As an elite unit from the world’s sole remaining superpower, the Rangers had grown confident of their capabilities against foes worldwide. The Somali Habr Gidr were seen as an inferior foe to those they had been trained to handle. The Rangers had been dropped into the antithesis of their credo. Somalia, a failed state occupied by roving

gangs and undisciplined mobs was a country that could not even feed itself, and now required outside help merely to survive. As the “baddest boys on the planet” the Rangers were assigned the job of cleaning it up.⁵⁷ Any rational comparison of capabilities (with the exception of numbers) showed a clear US superiority. But perhaps most dangerous of all it appears that the Rangers assumed that the Somalis had little capability to learn from their engagements with the Rangers and thereby adapt their tactics. Assumptions concerning Somali capabilities once validated in practice appear to have been set in stone and assumed as valid for all time. In other words, the planners may have been guilty of “mirror imaging” in that the Habr Gidr’s lack of strict organization and discipline—compared to the Rangers—led to the false conclusion that they would be unable to adapt and improve their capabilities. To summarize, the Rangers had three necessary assumptions that initially proved valid. These assumptions were a relative invulnerability of helicopters, slow response time, and an inability to adapt.

As alluded to above, in military planning, assumptions play an important role in the absence of hard evidence. An assumption has two ingredients. It must be “necessary” in that planning can not continue without the assumption, and it must be “valid” in that it proves to be true. The US assumption concerning the invulnerability of the Blackhawk helicopters was necessary because the overwhelming numerical superiority of the Habr Gidr precluded most operations into Mogadishu by ground transport. This assumption initially proved valid in that the Somalis were in fact incapable of engaging the helicopters effectively. Rational analysis of the Somali capabilities, leaning heavily on the lack of anti aircraft weapons and the past months of US involvement, led planners to this conclusion. However, on September 25th 1993,

when an RPG shot down a Quick Reaction Force (QRF) Blackhawk on a routine mission, US planners dismissed the incident as a “one in a million” lucky shot that was unlikely to be repeated. Hence the assumption helicopter invulnerability survived a possible warning of its approaching invalidation and was not revisited.⁵⁸ As previously discussed, one of the weaknesses of rational decision making “hyper-rationality” is the averaging out of aberrant data, thereby risking a dismissal of key indicators of changing conditions. It is possible that the US planners had fallen into this trap.⁵⁹

If the US planners dismissed the downing of the QRF Blackhawk as unrepresentative, the Somalis certainly did not. Recognizing the marked advantage that the helicopters gave the US forces, the Habr Gidr had set out on a deliberate program to develop the capability to shoot them down. “To kill a Ranger, you had to make them stand and fight. The answer was to bring down a helicopter.” The Habr Gidr received external advice from Islamic fundamentalists from Sudan who had experience combating Russian helicopters in Afghanistan. From the Sudanese the Habr Gidr learned some clever techniques on the use of RPGs in an anti-helicopter role for which the weapon had never been intended. The techniques included modifications to the RPG itself and the use of new tactics. First, the RPGs were physically modified with time delayed fuses to improve lethality without a direct hit, and an angled exhaust tube was welded to the rear of the launcher to divert the launch blast away from the shooter when pointing the weapon skyward. New tactics included methods of concealing the shooter from the helicopter gunners, waiting for the helicopter to pass overhead before rising to shoot, aiming at the tail rotor—the helicopter’s most vulnerable spot, and shooting from pits that enabled a skyward shot. Heartened by the success of downing the QRF Blackhawk, the

Habr Gidr deliberately planned to concentrate their RPGs on helicopters in future engagements with the Rangers.⁶⁰ On October 3rd 1993--just nine days after the QRF helicopter was shot down--this planning paid off. The Habr Gidr hit four helicopters of which two went down in Mogadishu. The Habr Gidr had accomplished their goal by a deliberately planned adaptation of weapons and tactics that nullified a key US advantage and forced the ground battle that the Habr Gidr sought as a means of exploiting their advantage in numbers.

The second key US assumption required to plan operations in Mogadishu--slow reaction time--was necessary for similar reasons to that concerning the invulnerability of the helicopters. The overwhelming numbers of Habr Gidr in the immediate vicinity of likely engagements required that US forces be able to get in and out before effective resistance could be mobilized. This assumption proved valid on the first six Ranger missions.⁶¹ But were there any warnings similar to the QRF helicopter shootdown indicating that the Habr Gidr were adapting? Although Captain Murphy's account of the attempt to clear roads carrying aid to northern Somalia showed a definite improvement in response time, this data point was contradicted by the lack of effective response to the first six Ranger missions. While there may have been conflicting data on whether the Habr Gidr response time was improving, it was not for lack of effort among the Habr Gidr.

Factors that led to improvements in Somali reaction time can be broken down into two broad but closely-related categories, namely, those deliberate efforts by Aidid's militia, and those related to the mindset of the average resident of Mogadishu. As will be shown the deliberate efforts—employing rational analysis—provided only marginal

improvements in response time. The decisive improvement resulted from the existence and adaptation of a complex adaptive system and a hive mind as it effected a fundamental change on the behavior of the average Habr Gidr clan member.

Aidid's militia was certainly making deliberate efforts to improve reaction time that employed rational analysis. With no working telephone system, the militia adopted the use of two-way radios and even signal fires for communication. Additionally, when the October 3rd 1993 raid hit the ground in Mogadishu, several Aidid militiamen were observed by US troops using megaphones to spread warning among the local populace and to garner public participation in the battle. This tactic was not mentioned in any of the accounts of previous raids. The Habr Gidr used the smoke from fires as a primitive signal to indicate where the engagement was taking place. This tactic had been used prior to October 3rd but not nearly as extensively as on that day.⁶² However, this is where the deliberate efforts (adaptation by rational analysis) to improve response time end. While these new techniques probably improve response time incrementally, none were effective at mobilizing an effective resistance force in a timely manner. The decisive adaptation to improve response time involved a fundamental change in the mindset of the average Habr Gidr clan member.

The change in mindset of the average Habr Gidr is where some of the most convincing evidence of complex adaptive system behavior is found. The early attempts to resist US intervention in Mogadishu were carried out primarily by the Aidid militia. The basic problem of concentrating power to oppose a US incursion rested in the fact that the militia was relatively small in number, consisting of perhaps only fifty or sixty small groups based on living groups and families spread out across Mogadishu. These self-

serving militia groups also known as “mooryan” and “revengers” were semi-independent of centralized control and consisted of those dedicated to Aidid and those inconsistently employed by him more as mercenaries.⁶³ Even if preemptively concentrated, which no evidence suggests was ever attempted, they were unlikely to be in the correct place. Reactive concentration of a suitable number of militia in time to engage a US force before they completed their hit-and-run raid was beyond the capabilities of the Habr Gidr militia.

Although certainly more numerous than the members of Task Force Ranger, the number of Aidid militia were certainly dwarfed by the adult population of Mogadishu. Here lies the key to the Habr Gidr tactical adaptation. The fundamental improvement in response time was the change in mindset of the average clan member (men, women, and children) to join the fight in a timely manner. This widely dispersed multitude of individual decisions--all pointed toward a common goal--bears the unmistakable signature of a complex adaptive system controlled by a hive mind. When the Rangers were inserted on October 3rd 1993, it was not the Aidid militia that responded so rapidly to form the overwhelming effort that converged on the various US elements; it was the multitude of on-the-scene, untrained clan members who, for individual reasons, chose to join the fight. These average clan members contributed in a wide variety of manners including direct assault, building of signal fires and erection of barricades. “To the officers watching on screens in the command center, it was like they had poked a stick into a hornet’s nest. [The Habr Gidr] were racing from all directions toward [the US positions].”⁶⁴ It is not a coincidence that so many of the accounts refer to the battle with words like “swarm” and “hornet’s nest”. They were witnesses to the human equivalent

of just such a confusing, yet focused phenomenon. In the non-linear manner predicted by Kelly, the Habr Gidr complex adaptive system had adapted its tactics and invalidated the US assumption of slow response time.⁶⁵

Of equal importance to the improved response time was the pattern formed by the parallel efforts distributed across distant parts of Mogadishu. With no single controller, the multitude of individual clan members self-organized into a overall pattern that synergistically worked to accomplish several complimentary tasks. These include direct assault on the soldiers of the ground, erection of barriers to block the original extraction convoy and the first rescue convoy, and the overrunning of the second Blackhawk crash site. In classic hive mind form, these independent, spontaneous efforts formed a pattern that contributed to the same overall goal of pinning down and destroying the US soldiers with no overall hierarchical leader to coordinate the effort.

Comparing the adaptation of the Habr Gidr to the third criteria of the test for a complex adaptive system provides mixed evidence. There appears to have been a mixture of adaptation by rational analysis and by the mechanism of a complex adaptive system. In retrospect the theory of complex adaptive systems predicted that in human systems this is the norm. Adaptation by complex adaptive system theory is not exclusionary. It does not seek to defeat rational analysis and monopolize all adaptation. Within a given human population, complex adaptive systems usually works in parallel with rational analysis. Although the adaptation in tactics to engage helicopters appears to have been accomplished primarily through deliberate rational-analysis decision making, the improvements in response time bear the clear signature of a complex adaptive system and a hive mind. The methods by which the Somalis improved their response time were

definitely novel and demonstrably effective. Finally, in true form to the theory, the adaptation followed a non-linear trial-and-error adaptive path that resulted in the sudden improvement suffered by the Rangers on October 3rd 1993. In the final analysis, Habr Gidr adaptation—achieved in large part according to complex adaptive system theory—outpaced the US planning effort.

Conclusion

One way of looking at the events of October 3rd 1993 is as the culmination of a contest between competing adaptation models. The US, reliant on rational analysis and apparently oblivious to other possible adaptation models, underestimated the Habr Gidr who adapted through both deliberate rational analysis and—perhaps unknowingly—by complex adaptive system theory. The US planners had underestimated their opponent's capabilities, but more importantly they had underestimated their opponent's ability to adapt. By October 3rd 1993, the more diverse method of adaptation employed by the Habr Gidr accentuated their one advantage (superior numbers) and adapted into the potent force, which fatally gored the unexpecting US matador.

The tactical adaptation of the Habr Gidr invalidated two key assumptions of the US force opposing them, namely the survivability of helicopters and ineffective response time. Superiority in both areas was necessary to accomplish the Ranger's method of operations. Unfortunately, both assumptions hinged on a single capability of the helicopter. Hence invalidation of one assumption—helicopter invulnerability—cascaded to invalidate the second assumption—relatively slow enemy reaction time. Although efforts to capture Habr Gidr leadership were canceled in the aftermath of the October 3rd

disaster, it was clear that further raids by the same methods were an unacceptable risk and hence, were no longer viable. The adaptation of the Habr Gidr had overcome key capabilities that the Rangers needed to operate at such a numerical disadvantage without unacceptable risk. The Habr Gidr had “broken the code” on how to oppose the Rangers and—although never again tested—the Rangers were incapable of effectively striking into Mogadishu.

While the data may not present a sufficient sample size to conclusively calculate a validity life span for planning assumptions as hoped for at the beginning of this monograph, it is interesting that both key assumptions were invalidated at the same time. One common trait of Operations Other Than War is the persistent nature of operations in full view of the enemy. The repetitive nature of the Ranger operations catalyzed the adaptive system of the Habr Gidr and stimulated improvement. The first six stimulating events apparently went unanswered. After the sixth, the Habr Gidr apparently were prepared as evidenced by the loss of the QRF helicopter on September 25th and the fateful battle on October 3rd. This suggests that adaptation of a complex adaptive system is not necessarily related to time, but is a function of the number of events that challenge the system. If US involvement in Somalia is representative of the competition between a combined rational analysis/complex adaptive system and a purely rational analysis system, then US military planners must revalidate all assumptions after no more than a few (in this case six) engagements with even the most apparently disorganized enemy.

In *Military Misfortunes* Eliot A. Cohen and John Gooch concluded that disaster stems from a combination of failure to anticipate, learn, and adapt. These failures are usually not absolute but are commonly a matter of degree in that the opponent, who

accomplishes these tasks best, wins the conflict. The opponent who achieves less on any one of these vital areas invites defeat, and if deficient in all three, true disaster awaits.⁶⁶ While numerous accounts on Somalia have provided a host of lessons learned in terms of tactics, organization, and command; none but this has investigated the manner by which the Somali Habr Gidr adapted their tactics. Many have investigated “what” happened, but in order to be usable in planning for similar situations in the future, the “how” of this adaptation must be better understood even if it challenges commonly held beliefs.

This monograph has attempted to warn future military planners that effective adaptation can arise out of a chaotic environment. This adaptation can invalidate carefully developed assumptions and lead to military defeat despite the best efforts of talented planners. Awareness of the possibility is the first step in eliminating vulnerability. Military planners must be aware—and are hereby warned—that in some circumstances asymmetric adaptation models can emerge alone or in parallel with rational systems. Clausewitz said “Any complex activity, if it is to be carried on with any degree of virtuosity, calls for appropriate gifts of intellect and temperament. If they are outstanding and reveal themselves in exceptional achievements, their possessor is called a ‘genius.’” *Coup d’oeil* and even “military genius” need not always reside in the single personage of Clausewitz’s great captain, but can perhaps be exercised by the distributed function of a hive mind that rises from the complex adaptive system.⁶⁷

In the post Cold War environment, certain aspects of missions assigned to US forces tend to put our fighting men and women in a position similar to the matador squared off against a bull who has been in the ring too long. First, the proliferation of Operations Other Than War (OOTW) is a fact. The US military has performed OOTW

often, but not at a rate approaching that of the last ten years. Peace enforcement, peacekeeping, and humanitarian assistance are rarely quick, decisive encounters and the objectives are always limited. The bull is not killed in fifteen minutes. The relatively slow paced operations provide a more perfect environment for learning and adaptation compared to conventional war. Second, the substitution of the linear battlefield seen in conventional war with the non-linear arrangement prevalent in OOTW puts the enemy in an improved position to watch, learn, and hence adapt to face our strengths and exploit our weaknesses. Immersed in the non-descript mixture of friendlies, ambivalents, belligerents, and enemies—surrounded in fact—the non-linear battlefield can also provide the closure to strike that might otherwise be prevented by superior weapons, sensors, and intelligence. The cape no longer protects the matador.

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END NOTES

¹ Ernest Hemmingway, *Death in the Afternoon*. (New York and London: Charles Scribner's Sons, 1952), 217-220.

² The quote is a common saying in both Spain and Portugal. The author first heard the saying in conversations while visiting Madrid and Salamanca in Spain in September 1991. The expression is also used in the Portuguese Azores where the author heard its use while visiting several times between December 1994 and June 1999. The expression is used as a warning of the bull's ability to learn and adapt quickly from his experience in the ring.

³ Mark Bowden, *Black Hawk Down*, (New York: Atlantic Monthly Press, 1999), 334.

⁴ *Ibid.*, 334.

⁵ Author's personal memory of numerous news broadcasts in the wake of the October 3rd 1993 battle and the subsequent Somali policy debate.

⁶ Kenneth Allard, *Somalia Operations; Lessons Learned*, (Washington: National Defense University Press, 1995), 10-15.

⁷ Lori Fisler Damrosch, *Enforcing Restraint: Collective Intervention in Internal Conflicts* (New York: Council on Foreign Relations, 1993) 213. As quoted in Terrence Lyons and Ahmed I. Samatar. *Somalia: State Collapse, Multilateral Intervention, and Strategies for Political Reconstruction*. (Washington: The Brookings Institution, 1995) 33. The numbers of those dead and threatened from starvation are also addressed in Kenneth Allard, *Somalia Operations; Lessons Learned*, (Washington: National Defense University Press, 1995), 10-15, although he puts the number dead higher at 500,000.

⁸ In the wake of the Somali civil war that ousted Siad Barre, General Aidid's Habr Gidr clan rose in prominence. As the most powerful clan in Somalia by 1992, the Habr Gidr were on the verge of consolidating power over most of Mogadishu, southern Somalia and the prosperous Shabelle and Jubba valleys. Aidid, expecting that his strength would soon bring him the presidency, had the most to lose by external intervention. See Center for International Studies: Princeton University. *Learning From Somalia: The Lessons of Armed Humanitarian Intervention*. Edited by Walter Clarke and Jeffrey Herbst. (Princeton: Westview Press, 1997) 5-8.

⁹ Lyons and Samatar. 57.

¹⁰ While no UN/US document or public statement uses the word "revenge" as a new mission for the international effort, the wording of UN resolution 837 is clear in that it

authorizes strong measures to be taken against the Habr Gidr clan. It is the author's opinion that the missions to capture Habr Gidr clan leadership were motivated in large part by the desire to enact punishment (revenge) on those deemed responsible for the attacks on UN forces. The various shifts in the policy and goals of the international effort in Somalia are detailed in Henry L. Stimson Center. *UN Peacekeeping, American Policy, and the uncivil wars of the 1990's*. edited by William J Durch, (New York: St Martin Press, 1996), Terrence Lyons and Ahmed I. Samatar. *Somalia: State Collapse, Multilateral Intervention, and Strategies for Political Reconstruction*. (Washington: The Brookings Institution, 1995), and United Nations. *The United Nations and Somalia: 1992-1996*. (New York: United Nations Dept of Public Information, 1996)

¹¹ Numerous sources detail the October 3rd, 1993 raid however only a few cover the six preceding raids. For detail on the October 3rd battle see Mark Bowden, *Black Hawk Down*, (New York: Atlantic Monthly Press, 1999). Mark Bowden went to great lengths to compile the details of the October 3rd battle. For primary source information on the October 3rd battle as well as information on the first six raids see the following personal accounts written in monograph length for the US Army infantry school. Thomas Di Tomasso, Capt. US Army. *The Battle of the Black Sea, Bravo Company, 3rd Ranger Battalion, 75 Ranger Regiment 3-4 Oct 1993*. (Ft Benning: US Army Infantry School, 1994), Charles P. Ferry, Capt. US Army. *The Battle of the Black Sea: (Breakthrough to Task Force Ranger)*. (Ft Benning: US Army Infantry School, 1994), Joe Frescura, Capt. US Army. *Mechanized Platoon and Company Operations in Somalia*. (Ft Benning: US Army Infantry School, 1996), Mark A.B. Hollis, Capt. US Army. *Personal Accounts of a Rifle Platoon leader 2nd Platoon, A Company, 2nd Battalion, 14th Infantry Regiment, 10th Mountain Division (Light)*. (Ft Benning: US Army Infantry School, 1997), James O. Lechner, Capt. US Army. *A Monograph of Combat Operations in Mogadishu, Somalia Conducted by Task Force Ranger*. (Ft Benning: US Army Infantry School, 1994), Kennard M. Murphy, II, 1Lt. US Army. *Multi-National Combined Arms Breaching (MOUT) in Somalia*. (Ft Benning: US Army Infantry School, 1994), Larry D. Perino, Capt. US Army. *The Battle of the Black Sea*. (Ft Benning: US Army Infantry School, 1994), and Lee A. Rysewyk, Capt. US Army. *Experiences of Executive Officer from Bravo Company, 3d Battalion, 75 Ranger Regiment and Task Force Ranger during the Battle of the Black Sea on 3-4 October 1993 in Mogadishu, Somalia*. (Ft Benning: US Army Infantry School, 1994).

¹² Eliot A. Cohen and John Gooch, *Military Misfortunes*. (New York: The Free Press, 1990), 161.

¹³ *Ibid.*, 161.

¹⁴ Gary A. Klein, "Strategies of Decision Making". *Military Review* 45-11(May 1989): 56.

¹⁵ Gary Klein, *Sources of Power*. (Cambridge: The MIT Press, 1998), 259-269. Information on the Military Decision Making Process is taken from Field Manual 101-5,

Staff Organization and Operations. (Washington, D.C.: Headquarters Department of the Army, 1997).

¹⁶ Ibid., 261.

¹⁷ Klein, "Strategies of Decision Making," 57.

¹⁸ Kevin Kelly, *Out of Control.* (Reading: Addison-Wesely, 1994), 1-22.

¹⁹ Ibid., 21.

²⁰ Ibid., 23-24.

²¹ M. Mitchel Waldrop, *Complexity.* (New York: Simon & Schuster, 1992), 9-13.

²² Kelly, 12-28.

²³ Kelly, 8-28, and Waldrop, 9-13.

²⁴ Kelly, 185-202.

²⁵ Ibid., 5-28.

²⁶ Kelly, 8-28, and Waldrop, 9-13.

²⁷ Kelly, 23.

²⁸ Ibid., 21-22.

²⁹ Kelly, 5-28, and Waldrop, 145.

³⁰ Kelly, 23-28.

³¹ Ibid., 184-194

³² Lyons and Samatar, 2. It is interesting that so many sources use the events of 1991-93 in Somalia as evidence for some greater trend. Before ever dealing with the specifics of events in Somalia, Lyons and Samatar devote the first chapter of their relatively small work to a host of wider issues including the ills of the Nation-State in general, the new types of peace-keeping efforts, and the new pessimism borne out of the difficulties of intervening in failed states.

³³ Henry L. Stimson Center. *UN Peacekeeping, American Policy, and the uncivil wars of the 1990's.* edited by William J Durch, (New York: St Martin Press, 1996), iii.

³⁴ According to most sources, for the average Somali, any pan-Somali spirit, the existence of which is certainly debatable, was never very strong compared to clan affiliation. Nevertheless, a small number of sources attempt to romanticize the historical, agrarian Somali culture as open and accommodating across clan lines. For example, Terrence Lyons and Ahmed I. Samatar. *Somalia: State Collapse, Multilateral Intervention, and Strategies for Political Reconstruction*. (Washington: The Brookings Institution, 1995), 8, describes early clan interaction as more of a serious-but-friendly competition where “blood payments” or “diya” were used to settle collective debts or to make restitution for inter-clan wrongs. However the majority of sources claim that inter-clan violence has been endemic throughout Somali history. One source, Center for International Studies: Princeton University. *Learning From Somalia: The Lessons of Armed Humanitarian Intervention*. Edited by Walter Clarke and Jeffrey Herbst. (Princeton: Westview Press, 1997), 67-72, describes the 1991-95 conflict as just another round in an ongoing “land resource war” where clans invariably seek to expand their territory to encompass the richest or most productive areas at the expense of neighboring clans. In ancient times, clans went to war over rich pastureland while in contemporary times the list of perceived productive areas has expanded to include seaports, population centers, and seats of government. All of the sources—save one—are in agreement as to the final state of poor relations between Somali clans. The one source in disagreement with the rest—while interesting to read—is suspect due to an obvious anti-American, pro-Aidid agenda. Ruhela, Satya Pal. *Mohammed Farah Aidid and his Vision of Somalia*. (New Delhi: Vikas Publishing House PVT LTD., 1994), is a biography of General Aidid written during US involvement in Somalia and published before Aidid’s death. The author is an Indian University professor and admitted long-time friend of General Aidid from his time as the Somali ambassador to India. The coverage of the book is sensationalist and unbalanced. Throughout the book, General Aidid is portrayed in only the kindest words while all of his opponents (domestic and international) receive the exact opposite treatment. The author’s repeated claims, backed up by Aidid’s personal accounts and selected international newspaper stories, include a deliberate destruction of Somalia by the international community, a nation-wide 80% approval rate for Aidid, a series of international plots, (led by the US through the UN, IMF, and World Bank) to steal Somalia’s “rich” natural resources which are hinted to include vast reserves of oil, and deliberate destruction of Mosques/banning of Islam by US forces. The author concludes that General Aidid is not only destined by God to lead Somalia into a prosperous future, but is in fact the only hope for Somalia.

³⁵ Lyons and Samatar, 7-10.

³⁶ Walter S. Clarke, *Somalia: Background Information for Operation Restore Hope 1992-93*. (Carlisle: Strategic Studies Institute: US Army War College, 1992), 2.

³⁷ Ibid., 2

³⁸ Bowden, 365.

³⁹ For a first hand account of the Somali clan's mixing of economic, political, and social life see Mohamed Jama Ghalib *The Cost of Dictatorship: The Somali Experience*. (New York: Lilian Barber Press, 1995). In this autobiography, the author, a Somali native who rose from village orphan to National Police Commander under dictator Siad Barre, details his rise to power and decent into disillusionment which led eventually to his covert support of the anti-Barre rebels. The first chapter of the book provides a glimpse of the nomadic family/village "rer" oriented economic and social structures of interdependency. Those same structures of clan oriented economic, political and social life carry over to the author's early city life in Hargeisa and on into his eventual positions of power. For an outsider's view of the same system, see Lyons and Samatar, 8.

⁴⁰ Library of Congress, Federal Research Division. *Somalia: A Country Study*. edited by Helen Chapin Metz, (Washington: Headquarters, Department of the Army, 1993) xxi.

⁴¹ Center for Army Lessons Learned (CALL) and Combined Arms Command (CAC). *Operation Restore Hope: Lessons Learned Report*. (Ft Leavenworth: US Army, 1993), 2.

⁴² Kennard M. Murphy II, 1Lt. US Army. *Multi-National Combined Arms Breaching (MOUT) in Somalia*. Ft Benning: US Army Infantry School (USAIS), 1994. Capt. Murphy's monograph is a well-written and fascinating account of the engineers' role and perspective of events in Somalia. His account of the attempt to clear obstacles from 21 October road on the west side of Mogadishu to restore ground communications to the northern half of Somalia is a chilling example of the problems posed by unclear command and control existent in some multinational efforts. I agree with Capt. Murphy that this effort was less effective due to the ad hoc nature of the multi-national effort, a lack of realistic planning, a lack of rehearsal, and the assignment of a mission for which the author's unit was not equipped or trained. However, I disagree that these were the main reasons for the mission's failure. The author gives no compelling evidence that even the most ideal improvements in command and control architecture, planning, training, rehearsal or equipment could have prevented the Habr Gidr from re-closing the road at will. With the sheer numbers and persistence of the Somalis intent on keeping the road closed, the mission was probably not possible within the restraints of the UN mission.

⁴³ Ibid., 18

⁴⁴ Bowden, 76.

⁴⁵ Lyons and Samatar, 8. See also Mohamed Jama Ghalib, *The Cost of Dictatorship: The Somali Experience*. (New York: Lilian Barber Press, 1995).

⁴⁶ Thomas Di Tomasso, Capt. US Army. *The Battle of the Black Sea, Bravo Company, 3rd Ranger Battalion, 75 Ranger Regiment 3-4 Oct 1993*. (Ft Benning: US Army Infantry School, 1994) 12. Personal account monographs such as Captain Di Tomasso's, written for the US Army Infantry School at Fort Benning, are a key part of the historical record of the October 3rd 1993 battle and are also a useful check for accuracy and completeness

of other sources especially books on sale to the public where the temptation to exaggerate events exists. The accuracy of Mark Bowden's book, *Mark Bowden, Black Hawk Down*, (New York: Atlantic Monthly Press, 1999), is consistent with the content of all available personal accounts listed above and below. For additional personal account monographs see also: Charles P. Ferry, Capt. US Army. *The Battle of the Black Sea: (Breakthrough to Task Force Ranger)*. (Ft Benning: US Army Infantry School, 1994), Joe Frescura, Capt. US Army. *Mechanized Platoon and Company Operations in Somalia*. (Ft Benning: US Army Infantry School, 1996), Mark A.B. Hollis, Capt. US Army. *Personal Accounts of a Rifle Platoon leader 2nd Platoon, A Company, 2nd Battalion, 14th Infantry Regiment, 10th Mountain Division (Light)*. (Ft Benning: US Army Infantry School, 1997), James O. Lechner, Capt. US Army. *A Monograph of Combat Operations in Mogadishu, Somalia Conducted by Task Force Ranger*. (Ft Benning: US Army Infantry School, 1994), Kennard M. Murphy, II, 1Lt. US Army. *Multi-National Combined Arms Breaching (MOUT) in Somalia*. (Ft Benning: US Army Infantry School, 1994), Larry D. Perino, Capt. US Army. *The Battle of the Black Sea*. (Ft Benning: US Army Infantry School, 1994), and Lee A. Rysewyk, Capt. US Army. *Experiences of Executive Officer from Bravo Company, 3d Battalion, 75 Ranger Regiment and Task Force Ranger during the Battle of the Black Sea on 3-4 October 1993 in Mogadishu, Somalia*. (Ft Benning: US Army Infantry School, 1994). All of these sources are consistent in their account of the October 3rd 1993 battle in terms of the repeated use of reckless tactics by the Somalis who opposed Task Force Ranger. This often-suicidal persistence resulted in high casualties for the Somali fighters and was attributed variously to fanaticism, determination, bravery, stupidity, and drug use. The high casualties suffered were certainly self-evident to the participating Somalis, yet they persisted in their attacks. The Somali attacks into the face of overwhelming firepower—especially from helicopters—bears an obvious similarity to the defensive mechanism of other complex adaptive systems such as beehives. These types of attacks serve as examples of duplication of effort, and non-optimal solution finding inherent to complex adaptive systems.

⁴⁷ Larry D. Perino, Capt. US Army. *The Battle of the Black Sea*. (Ft Benning: US Army Infantry School, 1994) 15.

⁴⁸ Murphy, 18.

⁴⁹ Clarke and Herbst, 18

⁵⁰ Bowden, 180.

⁵¹ Bowden, 98-99.

⁵² Of particular interest is the previously noted biography by Satya Pal Ruhela. Even this jaded source, which goes to great lengths to deify Aidid as a nationalist hero, makes no mention of Aidid having participated in the October 3rd 1993 battle even though such a claim would certainly have helped the author in his task of building Aidid's stature. Available accounts of General Aidid's radio broadcasts following the October 3rd 1993

battle also do not mention a role for Aidid or anyone else in leading the battle. In fact several claims of the “spontaneous” crowd reactions are claimed in Ruhela’s book.

⁵³ John W. Dower, *War Without Mercy, Race and Power in the Pacific War*. (New York: Pantheon Books, 1986) ix-xxi.

⁵⁴ Clarke and Herbst, 3-14.

⁵⁵ Perino, 5.

⁵⁶ Lechner, 14.

⁵⁷ Bowden, 10.

⁵⁸ The attitude of invulnerability of helicopters that persisted despite the downing of the QRF Blackhawk by an RPG is referred to most sources, but is best covered in Bowden, 88, Burton, 4, and Perino, 5.

⁵⁹ Klein, 259-269.

⁶⁰ Bowden, 108-111, and endnote 16 on 362. The information on Somali efforts to develop a capability to shoot down helicopters comes from Mark Bowden’s interview of Yousuf Dahir Mo’alim, a Habr Gidr militiaman. The militia were also referred to as “revengers” or “mooryan” (Somali for bandits). Such groups were not necessarily full time soldiers for Aidid. In practice they worked as mercenaries for Aidid during the period of the Ranger deployment to Somalia. Yousuf Dahir Mo’alim claimed to be party to the deliberate effort of the Habr Gidr to develop an anti-helicopter capability and claimed to have been with the man who shot down Michael Durant’s helicopter. He outlined the rationale and the deliberate program that the Habr Gidr pursued to develop an effective anti-helicopter capability using currently available means. In brief, the rationale was that by shooting down a helicopter, the Rangers could be forced into a decisive fight where superior Somali numbers could eventually be brought into action. Shooting down a helicopter served the double purpose of causing the Rangers to rally to its defense and preventing their means of escape after a raid. Yousuf Dahir Mo’alim revealed the connection to the Sudanese fundamentalists with Afghan fighting experience and described the RPG modifications and new tactics outlined above. He did not reveal who initiated the contact with the Sudanese advisors, how the new fuses were obtained, who actually modified the RPGs or how any training may have been conducted. He was clear that a decision was made to “focus their entire arsenal of RPGs” on helicopters, but did not say who made this decision. The fact that numerous RPGs were used on targets other than helicopters (every source confirms this) indicates that the decision to concentrate on helicopters was not adopted by all Habr Gidr, but was more likely the purview of those Aidid militia and mooryan who had deliberately prepared to engage helicopters.

⁶¹ . The assumptions made concerning the relatively slow reaction time are covered in Di Tomasso, 6, Lechner, 14-16, and Ryswyk, 8. While military planners knew that the Habr Gidr could mobilize superior force if given enough time, the general assumption borne out in the first six Ranger missions and other engagements was that this mobilization took about one hour. From this assumption, missions planned for a total duration of less than one hour were seen as relatively safe from being engaged by a superior force.

⁶² Bowden, 31.

⁶³ Ibid., 362. Mark Bowden's interview of militia Colonel Sharif Ali Mohamed revealed the size, organization, and nature of the Aidid militia. This militia Colonel confirms that Aidid's militia was small, disorganized, and mercenary in that militia groups usually worked for the highest bidder. Further detail on the nature of the militia, which reveals its general disorganization and weakness, comes from the interview with Yousuf Dahir Mo' alim covered on pages 108-111 and discussed in Bowden's same endnote. Yousuf Dahir Mo' alim admits that militia or "mooryan" groups often conducted raids on other Habr Gidr neighborhoods as simple criminal ventures for profit. See also end note 59 above.

⁶⁴ Ibid., 18.

⁶⁵ Kelly, 283-311. In both the empirical and computer models of complex adaptive systems, Kelly notes the non-linear nature of adaptation. Unlike hierarchical systems that adapt in a more linear relationship to input, the complex adaptive system tends to absorb a higher level of input and then adapt suddenly. This could explain the sudden improvement in Somali capabilities revealed on October 3rd 1993. Such a pace follows Kelly's model of adaptation.

⁶⁶ Cohen and Gooch, 165-197.

⁶⁷ Carl von Clausewitz, *On War*, edited and translated by Michael Howard and Peter Paret. (Princeton: Princeton University Press, 1976), 100-103.